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With Compliments of the Author.

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A CONTRIBUTION TO THE CLINICAL STUDY OF CATARRHAL INFLAMMATION OF THE BILE-DUCTS, WITH REMARKS ON THE USE OF NITRATE OF SILVER IN ITS TREATMENT.

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As the time allotted for this paper is brief, and its purpose a purely clinical one, I shall not refer to the different varieties of jaundice, nor to the various theories which have been brought forward to explain their mode of production. The subject to which I would specially invite your attention is that of catarrhal inflammation of the biliary ducts, with reference to its symptoms, complications, and treatment. It has been long known that the mucous membrane of these canals is liable to catarrhal inflammation, which is especially apt to arise in connection with gastro-duodenal catarrh. But I do not think that the full importance of the subject is generally recognized, nor that the serious symptoms or after-consequences to which it may give rise are fully appreciated. In endeavoring to sketch the clinical history of this condition, I shall depend exclusively upon my own observations, and shall thus be compelled to avoid references to the views of others.

Catarrhal inflammation of the bile-ducts, or hepatic catarrh as it may be called for brevity, occurs in both the acute and chronic form.

The anatomical changes which attend acute hepatic catarrh can rarely be demonstrated, because, in the first place, death rarely occurs in this stage; and further, because, as in the case of other mucous membranes, the lesions may disappear to a considerable extent, if not entirely, immediately after death. From an examination of the cases where death has occurred from the primary disease, in the course of which acute hepatic catarrh has supervened, as well as from analogy, the following changes may be given:—

Cloudy swelling and proliferation of the epithelium; œdema of the submucous connective tissue; marked vascular injection, and

even small interstitial hemorrhages The presence of plugs o inspissated mucus or of aggregated epithelial cells is usual. These may entirely occlude the ducts, in which case there will be rapidly developed great dilatation of the biliary canals above the point of obstruction. The portion of the duct where these changes are most frequent, and where they are productive of the most serious results, is that where it passes obliquely through the walls of the duodenum to open upon the mucous surface of the intestine. This part of the ductus communis choledochus, has been called the portio intestinalis by Virchow, who was the first (*Arch. f. Path. Anat.*, 1865, Bd. xxxii. p. 117) to call attention to the great importance of the apparently slight lesions of hepatic catarrh. It is very evident that a duct so narrow as the one under consideration, and occupying such relations to the intestinal wall, could readily be completely obstructed by the changes I have mentioned, especially if aided by swelling and infiltration of the enveloping intestinal structures. It is true, that in ordinary acute cases the obstructing cause is not sufficiently violent or lasting to lead to complete retention of bile for more than a short period—perhaps for not more than a few hours. But it is to be remembered that, in the first place, obstruction of the bile-ducts is very rapidly followed by serious changes in these canals and in the surrounding tissues; and that, in the second place, the gradual and prolonged influence of incomplete obstruction, aided as it usually is by frequently recurring acute exacerbations, during which the obstruction becomes complete, slowly but surely induces similar changes in the ducts or tissue of the liver. It is essential therefore that we should ascertain what are the anatomical changes which follow obstruction of the common bile-duct, and for this purpose we may refer to the experimental researches of Charcot[1] and of Wickham Legg.[2] It appears that within a few days after the application of a ligature to this duct, there is a marked proliferation of the epithelial lining, and that the connective tissue layer of the walls is infiltrated with abundant leucocytes. These changes affect the cystic and hepatic ducts, and the gall-bladder equally. The large ducts rapidly become enormously dilated. The irritation spreads from the walls of the ducts, and there is a proliferation and increase of the interstitial connective tissues. Later the hepatic lobules atrophy, and there is a progressive development of inter-

[1] Charcot et Gambault, Alterations du foie consecutives à la ligature du canal cholédoque. Arch. de Phys. 1876, No. 3, p. 272.

[2] Changes in the Liver which follow Ligature of the Bile-ducts. St. Bartholomew's Hosp. Rep., vol. ix. 1873, p. 161.

lobular biliary canaliculi. In places minute lobular abscesses form with their contents deeply stained with bile; and in other places small extravasations of bile take place from rupture of biliary canaliculi. Thus there is produced a form of cirrhosis of the liver, which is nearly always attended with enlargement of the organ, though in some extreme cases ultimate contraction may occur. Quite frequently a tendency to suppuration shows itself in the connective tissue forming the capsule of Glisson. These lesions begin at the point of obstruction, and extend more or less deeply into the substance of the organ, according to the completeness and duration of the obstruction. They may be partly due to an extension of irritation along the ducts from the point of obstruction, but I agree with Charcot in thinking that they are chiefly due to the action of the retained bile. This undergoes rapid changes, vibriones appear in the course of a few days, and it acquires highly irritant properties. The contents of the dilated ducts, in cases of complete obstruction, may be viscid bile with flakes of mucus and disintegrating epithelial cells; quite frequently a biliary sand is present, and in cases where the inflammatory action has been more acute and violent, there may be a muco-purulent liquid stained with bile. I have followed out this series of anatomical changes, for the purpose of giving completeness to our idea of the results of obstruction of the gall-ducts, and not because the more severe lesions are usually found in connection with catarrhal jaundice. There is no doubt, however, that in severe cases of this affection, with complete obstruction of the intestinal portion of the bile-duct, the earlier stages of the changes above described are present; and further, that in severe chronic cases, where a considerable degree of obstruction persists for a long time, rendered complete from time to time by the occurrence of acute exacerbations or by the passage of small gall-stones, the more severe and deep-seated lesions of the hepatic substance are gradually developed. It has been, I am satisfied, too much the habit to connect the idea of jaundice from obstruction, except in its slighter or more transient form, with the presence of gall-stones, or of pressure upon the bile-ducts; whereas, as I hope will become apparent from a careful study of the subject, a very large share in the production of mechanical jaundice must be assigned to inflammatory obstruction of the biliary passages. It is needless to dwell here upon what I shall have occasion to again allude to, the close analogies between the cause and results of this form of jaundice, and those of mechanical retention of other secretions, especially of the urine in case of stricture of the urethra. I would, however, call special attention to the fact, strongly

dwelt upon by Virchow, that in all cases of obstruction of canals from inflammatory swelling of their mucous membranes with infiltration of the submucous tissue, as in the case of the urethra, etc., the lesions disappear to a great extent after death; so that it is difficult to believe that the grave symptoms of mechanical obstruction existing during life can have been dependent on the slight anatomical changes which alone remain after the redness, the congestion, and the swelling have in great part disappeared, as they do after death.

Acute hepatic catarrh may occur as an idiopathic affection, or as a complication of gastro-duodenal catarrh, or of such affections as pneumonia, typhoid fever, etc. It is in young subjects especially that it occurs idiopathically, while in adults more frequently and also in children it is due to an extension of the catarrhal inflammation from the duodenal mucous membrane to the intestinal portion of the gall-duct. When it arises idiopathically it is usually the result of exposure to damp and cold, especially when the body is over-heated. The attack may or may not begin with a slight rigor, followed by some dull frontal headache, backache, and aching through the limbs. There is soon a febrile reaction of moderate intensity, but the pulse is generally but little accelerated, or may even be slower than normal. There is entire anorexia, vomiting, and a heavily furred tongue. Pain is usually complained of in the right side. It is, however, very variable in intensity, character, and locality. In some cases it is dull, and is referred to the whole hepatic region, while in others it is limited to the region of the gall-bladder and ducts, and is attended with great soreness there. In other cases still it assumes the form of violent and even agonizing acute pain, usually referred to the epigastric or hypochondriac regions extending through to the back and up towards the right shoulder; while in still other cases it resembles an intercostal neuralgia, and may be limited to the points of emergence of the anterior branches of the lower intercostal nerves. I have frequently observed both in acute and chronic hepatic catarrh, with paroxysmal pain such as I now describe, a series of intensely sensitive points (two or three in number) about one inch from the linea alba, and corresponding to the anterior cutaneous nerves of the abdomen (superficial branches of the lower intercostals). There may be but a single violent paroxysm of pain, or it may recur several times with a certain degree of periodicity, or it may be induced by the slightest exposure or imprudence. The *febrile movement* is also peculiar, and from the first tends to assume a distinctly remittent type, with evening exacerbations. In this form of hepatic catarrh

it does not, as a rule, terminate in sweating at any period of the twenty-four hours. The urine is usually dark from the second day, and the degree of discoloration increases in accordance with the severity of the attack and the degree of obstruction of the bile-duct. So too the feces are abnormally light in color, and may even become clay colored after a few days. There is always some degree of jaundice—but this may vary from a slight icteroid hue to deep and universal jaundice. It has seemed to me to attain a high degree most rapidly in those cases where there are sudden and violent paroxysms of hepatic pain, although, on the other hand, I have known cases in which violent attacks of hepatalgia occurred, but where the succeeding jaundice was slight. The termination in such cases is nearly always favorable, the symptoms readily subsiding under appropriate treatment in the course of a week or ten days.

In cases where the catarrhal jaundice is preceded by gastro-duodenal catarrh, or ensues as a complication of some serious disorder, its onset is not usually marked by such acute symptoms.

The following cases may be given as illustrations of the acute form of hepatic catarrh:—

Case 1. *Acute gastro-hepatic catarrh; fever of remittent type; painful points in abdominal walls; jaundice; rapid recovery.*—E. W., æt. 9, a very active boy, apt to become violently excited at play, was taken suddenly ill during a spell of severe weather in the winter of 1876. The attack was evidently brought on by being chilled while overheated from play. For two or three days he had not seemed as bright as usual; but at the onset of the acute attack he had a chill, followed by high fever; intense headache, backache, and aching through the limbs; frequent vomiting, excited by every thing swallowed; tongue heavily furred and utter anorexia. He also complained of pain and soreness in the right hypochondrium. The following day there was a distinct remission in the fever during the morning, followed by a marked exacerbation towards evening. The pulse, however, was unduly slow in proportion to the activity of the febrile movement. Calomel and bismuth were given by the mouth; quinia, which could not be retained by the stomach, was given in full doses in suppositories. On the third day jaundice of moderate degree appeared; the urine was dark; the bowels were costive, and the stools light colored. The fever was not broken by quinia, but continued for several days to exhibit evening exacerbations. There was distinct tenderness over region of transverse fissure of liver, and there were exquisitely sensitive points corresponding to the cutaneous nerves of the abdominal walls. As soon as the stomach was settled, the calomel and bismuth were suspended, and he was ordered nitrate of silver with opium in pill form. A rapid recovery followed, and he has remained perfectly well during past two years.

Case 2. *Acute hepatic catarrh, with violent attacks of pain, simulating intercostal neuralgia; jaundice; no gall-stone; rapid recovery.*—Miss H., æt. 25, a very strong, healthy lady, had exposed herself very much in skating many evenings in succession at the Rink. For several days she felt less well and bright than usual, and had slight pain in right hypochondrium. She was suddenly seized with severe pain in the evening, which increased until by 2 A.M. it was unbearable, and morphia had to be injected hypodermically. The pain was seated just at lower border of ribs, two inches to right of median line. It did not extend to the shoulder, or around

base of chest, but did seem to extend through to back. The attack was attended with vomiting, coldness of extremities, and a slow, labored pulse. The following day antiseptic doses of quinia were given, and the use of this remedy in diminishing doses was kept up for several days. No jaundice followed, and the attack seemed to have passed over, when, after a very trifling exposure, it returned about a week later with increased severity. On this occasion, it was evident that it was not mere neuralgia. After the acute pain had been controlled by morphia, there remained for several days tenderness in the region of the gall-ducts, and exacerbations of pain occurred towards evening. Deep jaundice followed, with urine heavily charged with bile, pigment, and with light, though not actually clay-colored stools. There was slight pyrexia, the tongue was coated, and appetite was very poor. Small doses of calomel and bismuth were used until the stomach was quiet; a blister was applied over seat of pain; and Carlsbad water and a pill of nitrate of silver, with belladonna, were ordered. Rapid and complete cure followed.

Case 3. *Catarrhal jaundice, complicating severe pleuro-pneumonia; recovery.*—Mr. L., æt. 45, a vigorous man, of excellent general health, was attacked with very severe pleuro-pneumonia of the entire right lung in February, 1878. He was alarmingly ill for two weeks, and when the violence of the general symptoms subsided, there remained a moderate degree of fever of hectic type, with evidences of imperfect resolution of the disease in the lower lobe. In the seventh or eighth week an abrupt increase in the general symptoms occurred, terminating in a sudden discharge of thick ropy pus, of quite offensive odor. It was evident either that an abscess had formed in the central part of the lower lobe of the lung, or that a circumscribed empyema, situated between the lung and the diaphragm, had discharged through the lung. About a week later, the appetite, which had been returning, again failed; the tongue became coated; considerable pain in the right hypochondrium was complained of, and some deep jaundice appeared. The urine became very dark, and the stools were putty-colored. The previous treatment was immediately suspended, and he was put on light diet, Carlsbad water and nitrate of silver, opium and belladonna. Blisters were also applied over the hepatic region. The attack of catarrhal jaundice yielded promptly; the expectoration diminished, and the subsequent convalescence was uninterrupted and rapid.

I may postpone the remarks that suggest themselves in regard to the diagnosis and pathology of acute hepatic catarrh until I have given a brief description of the chronic form. This may pursue a very chronic course, lasting for many years, without any severe acute symptoms, or, more frequently, its course is marked by acute attacks of greater or less violence occurring at irregular intervals.

Chronic hepatic catarrh is frequently associated with, and perhaps dependent on, chronic gastro-duodenal catarrh. It may follow an acute attack, which has not been thoroughly cured. It may be subacute from the beginning, and be caused by excesses or imprudence in eating or drinking, or by repeated exposures to vicissitudes of temperature, or to damp and cold. In some cases it is caused by direct injury, or by the irritation of a gall-stone. My experience would indicate that this form of the affection is common in females about the time of the menopause. As in the case of hepatic catarrh, the original and most usual seat of the disease is in the intestinal portion of the bile-duct; it may remain limited to this place, or

may extend up the ducts; and it is to a sudden increase of the lesions in this portion of the canal that the violent symptoms of the acute intermittent attacks are due.

The anatomical condition is one of partial obstruction due to swelling of the mucous membrane from infiltration and thickening of the connective tissue layer of the wall of the duct, and from the presence of viscid mucus or aggregations of proliferated epithelium. When the disease has lasted a long time, the ducts are found dilated, and there is more or less enlargement of the liver with sclerosis of its interstitial connective tissue. The change affects the bile-ducts and the gall-bladder as well. It is probable that the formation of gall-stones frequently ensues as a consequence of the morbid state of the lining of the ducts, and of the impeded flow of bile. These calculi may form either in the gall-bladder or in the finer gall-ducts high up in the substance of the liver. The above are the more usual results; but it sometimes happens, that when in this state of affairs a sudden and severe acute attack occurs with complete occlusion of the bile-ducts, evidences of septic irritation quickly show themselves. The retained bile and morbid mucus undergo putrefactive changes very quickly, and a tendency to multiple centres of suppuration may show themselves in the neighborhood of the ducts.

The symptoms of the subacute form of hepatic catarrh are much like those which are frequently described under the head of congestion of the liver. Undoubtedly this latter condition is of common occurrence, and may exist without the complication of a catarrhal state of the lining membrane of the biliary ducts. But it is equally true that here, as in the case of other canals with a mucous lining, prolonged congestion is apt to induce catarrh, and, further, that subacute hepatic catarrh may exist as a primary affection. I think, indeed, that in some cases the long-continued partial obstruction to the escape of bile, and the consequent distension of the bile-ducts, with changes in their walls and in the surrounding connective tissues, cause considerable interference with the hepatic circulation, and thus induce congestion of the liver.

The digestion is always deranged. Occasionally the appetite is regular, but more frequently it is greatly impaired; and in rarer instances there may be present craving for special articles, or even fully developed boulimia (see Case 8). It is usually found that all heavy food, such as fat meat, pastry, fried dishes, fresh bread, will not agree with the stomach; and sometimes there are special articles of food, such as fish or acids, which disagree violently, and even cause an acute exacerbation of catarrh with spasm and jaundice. These symptoms are probably dependent in considerable

part on the gastro-duodenal catarrh which is so frequent an accompaniment. There is nearly always *hepatic pain*. This may be a constant dull pain with dragging sense of weight or distension in the hepatic region, or it may take the form of occasional sharp lancinating pains. A sensation that has caused much distress in several of my cases is that of extreme warmth or burning. This has been referred to the region of the bile-ducts, and has always been pretty constant, though subject to exacerbation from any cause capable of irritating the mucous membrane. In addition to pain, there is constantly tenderness over the gall-bladder and gall-ducts. Sometimes this tenderness is distinctly localized, occupying a small spot corresponding with the point of entrance of the bile-duct into the duodenum; at other times it is much more diffused. It frequently interferes with wearing any tight clothing. I have also observed in several cases, the presence of exquisitely painful points in the abdominal walls corresponding to the anterior cutaneous nerves.

The bowels are usually costive, unless a marked degree of intestinal catarrh coincides, in which case diarrhœa is apt to alternate with costiveness. The urine is, as a rule, high colored; though occasionally I have known copious discharges of light-colored urine alternate with the more usual dark-colored secretion.

The appearance of patients with chronic hepatic catarrh always indicates marked impairment of nutrition. Emaciation is frequently considerable—a loss of 20 or 30 pounds in one or two years not being unusual. In Case 8 the loss of flesh reached the enormous figure of 110 out of 230 pounds. The conjunctiva is icteroid and the complexion is muddy or sallow. Sometimes, as in Case 8, brown discoloration of the face, simulating Addison's disease, may be ultimately developed. More rarely the degree of permanent obstruction is so great that a high degree of jaundice is constantly present.

The temper and disposition frequently undergo change, and the patient becomes irritable, querulous, or despondent. In many cases the above train of symptoms is interrupted from time to time by attacks of acute catarrhal jaundice of varying severity. Sometimes they are developed by the most trifling causes; a slight exposure to damp, a single indigestible meal, will in such patients produce a violent and alarming illness. The number of these acute intercurrent attacks has amounted, in some of my cases, to 40, 50, 60, or even more. The symptoms of these exacerbations differ somewhat from those I have above described in cases of primary acute hepatic catarrh. The obstruction of the bile-ducts more con-

stantly and rapidly becomes complete, owing to the previously thickened state of its walls. Jaundice appears, therefore, much more quickly and becomes more intense; vomiting is more violent and uncontrollable. The attacks are also much more frequently attended with acute and agonizingly severe pain—hepatic colic—such as we have seen to occasionally attend acute hepatic catarrh (Case No. 2). Finally there is usually more severe and lasting soreness and inflammatory action around the seat of obstruction.

The following may be taken as fair examples of ordinary chronic hepatic catarrh, with acute exacerbations:—

Case 4.—Mrs. T., æt. 52; seven children; enjoyed good health until two years ago, when the menopause occurred. This occupied nearly a year, and during the time she was attacked with vomiting and diarrhœa, and severe pain in right hypochondrium. Jaundice followed and lasted for several days. Following this there has been constant tenderness in right hypochondrium over gall-bladder and ducts; and frequent attacks of similar character have occurred at irregular intervals, sometimes every week. A course of nitrate of silver, opium, and belladonna, with Carlsbad water, soon put a stop to these attacks.

Case 5.—Mrs. B., æt. 44. In May, 1872, was much alarmed by a fire, and was troubled with a stinging pain under the right shoulder, extending through to the front. In August, 1872, had severe attack of jaundice, and was confined to bed nearly all winter. She has never felt perfectly well since, and always has some tenderness over the region of the gall-bladder. The urine is usually normal in appearance, and the stools also. Appetite fair, but she has fallen from 170 to 123 pounds in weight. She has had numerous attacks of catarrhal jaundice since the first severe one. Sometimes they appear suddenly; at other times they are preceded for a few days by languor, pain, and increased tenderness in right hypochondrium. They are caused even by the least exposure, and also by certain kinds of food, and especially by fish. The attack begins with violent pain in the pit of the stomach, extending through to the back, and around the base of the chest, chiefly on the right side. It does not extend to the right shoulder. The day following, there is jaundice, with pale stools, and dark bile-stained urine. The jaundice passes off in a few days, and the secretions return to their natural color. No gall-stones have ever been found, although carefully looked for.

Treatment.—Argenti nitratis, gr. $\frac{1}{6}$; ext. opii. gr. $\frac{1}{6}$; ext. belladonnæ, gr. $\frac{1}{16}$. Ft. pil. No. 1. s. t. d. Repeated small blisters over right hypochondrium. Carlsbad water. Restricted diet.

A rapid and complete cure followed, though the digestion continued sensitive.

Case 6.—Mrs. M., æt. 49. Menopause at 44. Since then dyspeptic, and every three or four weeks has an attack lasting several days, beginning with pain at epigastrium and just above the right mamma, and attended with loss of appetite, flatulence, constipation, jaundice, dark urine. Under a restricted diet, Carlsbad water, and an occasional blue pill, the spells became less frequent and less severe; but tenderness remained over seat of gall bladder and ducts, and occasionally slight jaundice with pain in region of liver would occur. She was then put on use of nitrate of silver and belladonna with Carlsbad water, and speedy cure followed.

Case 7.—Mrs. S., of Reading. Seen with Dr. Beaver, of Reading, in April, 1876. Had enjoyed general good health until 1874, when about a month after the birth of one of her children, she had a mild attack of hepatic catarrh. Following this, there was occasional dyspepsia, and at irregular intervals

several slight attacks of pain in hepatic region. In 1875, these attacks became much more frequent and violent, the pain being very intense and lasting several hours, followed by persistent and extreme soreness; very dark urine, clay-colored stools, deep jaundice, intense itching of the skin. There had been a great number of these attacks, so that when I first saw her, her health was broken down, and she had lost fully 25 pounds in weight, was constantly jaundiced to a varying extent, and had wretched digestion. At first she was ordered Carlsbad water, restricted diet, and dilute muriatic acid, with chlorodyne for the attacks. This seemed to afford relief for a time, but the attacks soon returned in full severity. On March 16, 1876, she was ordered nitrate of silver, gr. $\frac{1}{4}$; pulv. opii, gr. $\frac{1}{4}$; ext. belladonnæ, gr. $\frac{1}{8}$; and to continue Carlsbad water and restricted diet. She had a very severe spell the day afterwards, but after that has never had any return. Her digestion rapidly improved, jaundice entirely disappeared, and the secretions became entirely normal. The soreness gradually disappeared from hepatic region. She took 30 grains of nitrate of silver, and at the end of that time was able to discontinue all medicines. I saw her in September, 1876, in very good health. Menopause evidently begun. She gained flesh, and looks very well. Appetite good, and digestion better than for years. Has been committing imprudences in diet, and has noticed during past few weeks occasional flashes of heat in stomach, with slight feeling of weakness and sensitiveness. At such times the arms feel weak and heavy as though they would drop. Diet again restricted, and 1 dozen bottles of Carlsbad water and 12 grains nitrate of silver given with perfect success. I saw her late in September, 1877, in perfect health. Has gained 20 pounds in flesh. Has had no pain since spring of 1876. Has no trouble with digestion, but is still somewhat careful.

In the following case, the discoloration of the face and neck was so closely similar to that of Addison's disease, as to have led to errors in diagnosis on the part of several physicians. The chronic gastro-hepatic catarrh was also accompanied by the most intense paroxysmal and uncontrollable boulimia I have ever seen.

Case 8.—Mr. D. W. P., æt. 31, a farmer from Clinton, Louisiana. In 1871 he overstrained himself, and a few days afterwards had a severe attack of bilious colic, with violent pain in right hypochondrium, fever, vomiting, jaundice, clay-colored stools and dark urine. During next four years had at least fifty similar attacks, caused by slightest exposure or imprudence in diet. No gall-stones were ever found. The weight fell off from 230 to 120. He gradually acquired a peculiar brown discoloration of the face and neck, strongly suggestive of Addison's disease. The violent attacks ceased in 1875, but there continued a chronic gastro-hepatic catarrh, with intense dyspepsia, and most extraordinary boulimia. His excessive indulgence caused horrible suffering, partly relieved by vomiting but leaving increased gastro intestinal distress. After coming to Philadelphia to be under my care, I kept him for a considerable time on exclusive milk diet, Carlsbad water, nitrate of silver, opium, and belladonna, and repeated blistering over right hypochondrium. His improvement was at first slow, but in the course of three months, during which this treatment was steadily pursued, with the exception of occasional interruptions of the nitrate of silver, he gained eight pounds, overcame his boulimia entirely, and lost nearly all of his gastric distress, and very much of the peculiar discoloration. He took in all about 50 or 60 grains of nitrate of silver; no line appeared on the gums, and not a trace of discoloration of the skin. He returned home in January, 1877, and had no further medical care. By July his weight had gone up 175, and he was in excellent health.

In the following case, there was marked enlargement of the liver with constant jaundice, which raised the question of cancerous disease of that organ.

Case 9.—Mrs. W., æt. 51, came under my care early in 1876. She had enjoyed general good health until the past few springs when she suffered from attacks of hepatic catarrh, confining her to bed for several weeks each year, with a severe dull pain in the hepatic region, irregular febrile action, anorexia, and vomiting. These attacks were attended with but slight jaundice. For two years she recovered entirely after the attack, and had no recurrence of it at any other period of the year; but after the attack in spring of 1875, she noticed that indigestion persisted and that she was unable to eat a number of things. During that spring she passed through much fatigue and anxiety; and soon began to have frequent spells of pain in the epigastrium and region of gall-bladder. The attacks recurred at irregular intervals, and without any apparent cause save trifling indiscretions in diet; each one came on gradually, reached its height in a few hours and then gradually subsided. During the attack, and for a short time afterwards, there was utter anorexia and frequently vomiting. There was always irregular fever for several days. After each attack she became jaundiced, which continued for several days, gradually fading away till next attack. Finally, by September, 1875, the jaundice became constant. There had been numerous attacks, such as the above, between August, 1875, and February, 1876, when I first saw her. She had taken blue pills and dilute nitro-muriatic acid for some time without advantage. Gall-stones were repeatedly searched for, but none were found. I found her deeply jaundiced. She had lost at least twenty pounds of flesh. The tongue was coated, the appetite poor, and digestion weak and painful. She complained constantly of a dull pain in the region of the liver, associated with a very disagreeable feeling of unnatural warmth. Examination of the liver showed that it was much enlarged, extending fully three inches below the margin of the right ribs, and reaching as high as normal. The enlargement affected both lobes. Palpation showed that it was hard, its surface smooth, and its edge not very much rounded. No nodules could be discovered. The feces were habitually light-colored; and the urine contained bile-pigment. The diagnosis of chronic hepatic catarrh having been made, she was placed on a rigorously restricted diet, and was directed a pill of nitrate of silver, gr. $\frac{1}{4}$, ext. opii, and ext. belladonnæ, each gr. $\frac{1}{6}$, thrice daily after meals, and Carlsbad water. Later the opium was omitted, after the pain and soreness was relieved. She took 60 grains of nitrate of silver in all; 40 grains at first, then, after an interval of a month, 15 grains more; and later, after a longer interval, 15 grains more. Repeated blisters were also applied over the region of the gall-bladder and gall-ducts. She drank six dozen of Carlsbad water. After the establishment of this treatment not a single attack of hepatic colic occurred. The jaundice rapidly disappeared, and the secretions resumed their healthy color. Her digestion was completely restored, and she regained her former weight. The liver diminished in size, but did not return to its normal dimensions; all pain or discomfort connected with it however disappeared. A complete cure was effected in the course of about eight months, and it has now (May, 1878) been over twelve months since treatment was suspended and her health continues excellent. No trace of discoloration of the skin or of the gums occurred.

In some very severe cases the evidences of local inflammatory action and of constitutional disturbance are much more marked, and the obstruction to the flow of bile is more lasting. It is in these cases that the peculiar form of febrile action, "hepatic fever," which we have had frequent occasion to notice, may become very marked, as much so indeed as in cases where there is closure of the bile-duct from impacted calculus or from pressure of a tumor. It is very difficult to decide in some of these cases whether the hepatic catarrh is not complicated by the presence of a gall-stone,

lodged in some part of the bile-ducts or in the gall-bladder, and aiding by its presence in maintaining and aggravating the local inflammation. It is evident also that the inflammation frequently extends from the walls of the bile-duct to the surrounding peritoneum, and that a local peritonitis with exudations and adhesions is excited. The two following cases are striking instances of this grave form of the disease. In the first one, it seems to me very probable that there existed a calculus in the gall-bladder, and that becoming impacted in the cystic duct, it excited violent inflammation of the ducts and of the gall-bladder, with temporary obstruction to the flow of the bile, and also severe local peritonitis. I have no doubt that, if a calculus did exist, it still remains in the gall-bladder, which is probably thickened and contracted around it. The hepatic fever in this case, to whose pathology I shall hereafter have occasion to allude, was most intense and alarming.

Case 10.—Sarah F., æt. 24, married, one child. A woman of sanguine temperament; small frame; temperate, and of quite active habits. Had suffered for four or five years from "cramp spells," at varying intervals. These spells were attended by very severe pain in the right hypochondriac region, coming on suddenly and lasting with very great severity for about twenty-four hours. There was also great prostration and occasional vomiting. The attacks were followed by no jaundice or discoloration of the urine; and usually confined her to bed for about one week.

In the summer of 1870 she had the most severe attack she had ever experienced—and then the attack was diagnosed as due to a gall-stone.

I first saw her February 5, 1871. She had been taken sick January 23, 1871, with agonizing pain in right hypochondrium—so severe as to cause screaming. It did not continue so severe as this but for a day, but was subsequently still very bad, with great tenderness in region of gall-bladder. Deep inspirations caused her severe pain, so too did coughing. She had utter anorexia; great thirst; occasional vomiting. Bowels obstinately constipated. Utter sleeplessness. Jaundice appeared in two or three days and soon grew intense. Urine, brown as porter.

She remained in same condition until I saw her, February 5, 1871. She was then intensely jaundiced—skin, conjunctivæ, mucous membrane of mouth. Skin of a dark orange yellow with dark olive tint; mind dull; tongue foul and pasty; anorexia; skin, hot and dry; sleeplessness; pulse feeble and frequent. Respiration, short and shallow, from fear of pain caused by full inspiration. Urine, intensely colored; no albumen; abundant urates; no bile-acids. Liver not enlarged itself, but fulness over region of gall-bladder, where slightest pressure caused intense suffering. Stools obtained by enema were fetid and brown.

R. Chloroform and aconite liniment over liver. Ext. opium gr. i, t. d., in suppository chiefly at night to secure rest.

Chloroform gtt. x q. t. h. in water. Beef-tea and milk, with about f℥iij whiskey daily. Enemas and occasional doses of Rochelle salt as laxative. But little improvement was visible for some time. The jaundice and coloration of urine continued intense. But there evidently was some little escape of bile into intestines, because stools, although light-colored, were not really clay-like. Emaciation was neither marked nor rapid. No brain symptoms. No bile-acid in urine.

Local tenderness in region of gall-bladder continued and even increased, until lightest touch was intolerable. A more and more distinct tumor made

its appearance below ribs, until an ovoid, firm, elastic, and exquisitely sensitive mass could be traced three inches below ribs. It was broader than could have been expected were it composed only of the distended gall-bladder. The extreme pain and tenderness made it evident that there was local peritonitis, and that the tumor was in part composed of lymph exuded around the gall-bladder, the duct of which was obstructed by a calculus. Sleep was, however, obtained by opium; and under the quieting influence of this, some food could be taken, and the bowels were opened daily, – thin, very fetid, sero-feculent stools, colored light brown, with clay-colored flakes floating in them. In about three weeks jaundice and pain became less intense; but daily febrile paroxysms with night-sweats made their appearance, and these hectic attacks soon grew very severe. Distinct rigors at variable hours ushered in high fever of varying duration, which was followed by prolonged and drenching sweats.

Quinia was now added to the treatment; and warm poultices kept constantly applied over enlarged gall-bladder.

Quinia produced some diminution of fever, but no relief to sweats, which were very exhausting, and as the pain had greatly diminished, chloroform was stopped and gallic acid, gr. xv q. q. d. given in powder. No relief; acid sulph. aromat. gtt. xv q. q. d. in water as a lemonade. Quinia, gr. ix to xij daily, continued.

The tumor grew less sensitive, but became more and more prominent, as if it would perforate anteriorly. No fluctuation could, however, be detected in it; it felt, indeed, quite firm and resisting.

I intended to tap this, after securing adhesion by potass. fusa, as the hectic paroxysms continued unabated, and the jaundice was diminishing. There was also increasing emaciation.

In a few days, however, the prominence grew less distinct, tenderness grew less and less, till soon the tumor could be handled without producing much suffering. The tongue began to clean, appetite began to appear. Bowels continued regular, with a tendency to looseness, which became more pronounced, the stools numbering two to three daily, liquid, with flakes of clay-colored and brownish fecal matter floating in them. Hectic with profuse sweats (at nights or at irregular hours during day) continued. Jaundice disappearing.

She improved steadily from this time. The tumor steadily contracted and grew harder. On March 17, she was able to leave bed for a little while, and convalescence fairly began.

On April 6, still had pain in right hypochondriac region daily. Attacks occurred in morning or afternoon, without distinct relation to eating; lasted an hour or so. No jaundice; tongue moist and clean; bowels regular; appetite good. Still a hard nodule to be felt in region of gall-bladder below ribs, slightly sensitive on firm pressure.

Chloroform gtt. x; tr. card. comp. ʒj, t. d. p. c. in water. Convalescence steadily progressed. There was no return of jaundice, and in the course of another month her health was entirely re-established. No gall-stone was ever detected, though frequent search was made. There was, moreover, no time at which such marked change in the symptoms occurred as to indicate the sudden removal of the cause of obstruction. If a calculus existed, I doubt not that it still remains in the gall-bladder, which is probably much thickened and contracted.

I had, unfortunately, not learned the remarkable value of nitrate of silver in cases of this kind at the time I had to treat the last patient. I believe that an early resort to this drug would have materially shortened her terrible illness. The following case of similar character, though of even greater violence, was the one in

which I first used nitrate of silver in hepatic catarrh. Until its use was adopted the patient was certainly losing ground day by day, without any subsidence in the symptoms of obstruction of the bile-duct. After its administration was begun, improvement soon showed itself. I believe that the successful termination of the case was due to the prolonged use of nitrate of silver, after all other means of treatment had failed. I am unable to decide whether the case was complicated by the presence of a gall-stone in the gall-bladder or cystic duct. It seems very likely that there may have been one or several there. But it is very clear that the obstruction of the common bile-duct was due to local inflammatory action.

Case 11.—Mrs. G., married, and the mother of nine children. Enjoyed excellent health until the age of forty-eight. She was stout, weighing 160 pounds; but was always active and energetic. The only excess she committed in diet was in use of tea, of which she took as much as f℥xij thrice daily. At age of forty-eight years, in 1868, when in ordinary good-health, after a dinner of corn-beef and squashes she was seized with pain at the epigastrium of a most violent, spasmodic nature. It continued eleven hours, and required etherization. She was confined to bed for two months; had intense and constant nausea for two or three weeks; lost much flesh and strength; but was not jaundiced. During this period she had occasional spells of pain in epigastrium of moderate severity, lasting a few hours. For some weeks she was unable to turn in bed. She suffered much with foul, bitter taste in mouth, and with most offensive subjective smells. She regained her usual health in about three months.

Two years later, in 1870, a similar attack occurred and lasted two weeks. It was apparently brought on by wringing clothes. She does not think it was followed by jaundice. Following this attack, she was obliged to be careful in her diet; and whenever she over exerted herself she felt slight pain to the right of the epigastrium. In September, 1872, after imprudence in exertion and in exposing herself to damp, she began to feel increased discomfort in region of the liver. The digestion became more disturbed and the action of the bowels irregular. On September 4, 1872, I saw her first in a marked attack of hepatic colic, followed by jaundice. The pain and symptoms of obstruction did not cease suddenly, but on the contrary there were marked evidences of local inflammation which slowly subsided. The stools were carefully searched for days, but no gall-stone was found. She improved slowly and was able to be about by October 1st; but three weeks later, from a single imprudence, an acute and violent relapse was brought on, and lasted for more than four months. Although it was evident that some little bile reached the intestines, the jaundice was intense, and did not pass away, nor the secretions regain their natural color for several months. The urine contained bile-acids, a little leucin, and was very dark. There was frequently recurring vomiting with utter anorexia. The symptoms would improve slightly, and then without apparent cause a violent attack of hepatic colic would occur while she was quiet in bed. There was a good deal of irregular fever. The only possible explanations of these frequently recurring spells of colic were either that the bile-duct was almost completely closed by inflammatory thickening or by an impacted calculus, and that a slight increase of congestion and swelling connected with increased gastro-duodenal irritation from undigested food, caused complete closure and dammed back the flow of bile; or that they were due to spasm merely; or, finally, that they were due to the passage of biliary gravel through a bile-duct almost completely obstructed by inflammatory swelling of its walls. A close watch was kept for the passage of a gall-stone, but none

was found. The symptoms gradually subsided, and she regained fair health by the end of March, 1873.

Very many remedies were tried during this attack, but without definite result; more benefit seemed to follow blisters than any other remedy. She regained fair health, though she always had tenderness over right hypochondrium, and was obliged to be very careful in diet. In 1874 she nursed a son through a painful illness and had several threatenings of an attack, but no recurrence of severe hepatic catarrh took place till December 1, 1875, when after unusual exposure to damp and cold, conjoined with fatigue, she began to have slight irregular fever, loss of appetite, and increased soreness over region of gall-bladder. A violent attack of hepatic colic soon occurred, and was followed by a most desperate illness, which confined her to bed for over four months. Jaundice soon appeared, but although it became quite deep, it was evident that the obstruction was not complete, since the stools always contained some bile. They were, however, much lighter in color than natural, while the urine was very dark. There was constantly a slight febrile movement, but for several weeks there were also severe paroxysms of intermittent fever of tertian or quartan type. The chills were very severe and did not occcur at regular hours; the febrile stage was marked but not of long duration, and the sweat was copious and attended with great exhaustion. Occasionally the cold stage was accompanied with an attack of hepatalgia. The spells of pain were very frequent and came on without apparent cause, though the slightest indiscretion would always produce one. They were as violent as I have ever seen to attend the passage of a gall-stone. She soon assumed the appearance of a pyæmic patient, with sunken features, rapid and extreme emaciation, a dry, brown tongue, with sordes, excessive nervous irritability and insomnia. There was a distinct hardness over the region of the gall-bladder, with exquisite tenderness on pressure. There was also some degree of enlargement of the liver. Gall-stones were carefully searched for, but never found. There was utter anorexia, and frequent vomiting of greenish, glairy acid mucus. Quinia in large doses failed to check the febrile paroxysms, which were influenced favorably by large hypodermic injections of morphia, given in advance of the cold stage. Hypodermic injections were also very freely used to relieve the spells of hepatic colic. Vichy and Carlsbad water, mineral acids, small doses of calomel with bismuth, chloroform, and many other remedies were used without advantage, and the patient certainly seemed likely to die. In this condition, the use of nitrate of silver, gr. $\frac{1}{4}$, with opium gr. $\frac{1}{4}$, twice daily, was begun. Almost immediately, evidences of its beneficial action showed themselves. The spells of colic grew lighter and soon ceased; vomiting was controlled; and the local soreness soon began to diminish. It was continued until fifty grains had been taken, by which time the patient was completely cured, and all hardness or tenderness had disappeared from region of gall-bladder. A blue line made its appearance on the lower gum, corresponding to the two incisors, canine and first premolar teeth on right side of jaw. This line, which I have elsewhere shown to be the first sign of argyria (*Trans. of Coll. of Phys. of Phila.*, 3d series, vol. iii. 1877, p. 39), warned me to discontinue the silver salt. No discoloration of skin occurred. This time the cure was complete; the patient has since been in perfect health with excellent digestion, and has gained fully fifty pounds of flesh.

In these two last cases, among the most prominent symptoms was the febrile movement, and I may with propriety speak here of this subject, so important both in a symptomatic and diagnostic point of view. In its milder forms, such as attend acute hepatic catarrh of moderate severity, it may simulate a mild quotidian intermittent, as in Case 1. But the absence of malarial exposure; the fact that there is no chill or rigor after the initial one, but merely

distinct increase of fever towards evening, with perhaps some moisture during the night; the existence of distinct tenderness over the gall-bladder and ducts; the greater degree of gastric disturbance, the occurrence of more or less deep jaundice, and the failure of quinia to completely arrest the febrile movement, will establish the diagnosis. It is not necessary to invoke any other influence in explanation of this febrile state but the local inflammation of the duodenal and hepatic mucous membrane. It is well known that in acute mucous catarrh, the sympathetic fever frequently presents a remittent type.

But in more severe cases, fever of a different type may be present. There may here be more or less constant febrile movement, usually of moderate severity, but in addition there are severe febrile paroxysms, comprising the stage of chill, fever, and sweat, and occurring at irregular intervals, or presenting quotidian, tertian, or quartan type. These attacks may be distinguished from malarial attacks, with which there is danger of confounding them, by the concomitant features of the case, by the fact that the accessions of fever are usually in the evening, and by the inability of quinia to control their recurrence. They occur especially in cases where severe mechanical injury has been inflicted on the bile-ducts by the passage of a large gall-stone; or, as in the above cases, where a severe inflammatory condition of the bile-ducts has existed for some time, particularly when associated, as it usually is, with marked obstruction to the flow of bile. The studies I had the opportunity of making in regard to this type of fever, before the appearance of the researches of Charcot, (*Brit. and For. Med. Chir. Rev.*, Oct. 1876, from *Le Progrès Medical*, Aug. 1876), had led me to adopt the view, so ably advanced by him, that in addition to the element of fever sympathetic with the severe local inflammation, there is a marked septic element due to the absorption of some infectious matter developed in the altered bile and morbid mucus contained in the inflamed and dilated ducts. The hepatic fever is therefore in part an infectious fever, having close analogies with septicæmia. It is well known that in all febrile diseases of this type the same law of irregular periodicity in the paroxysms prevails.

It will be readily understood, therefore, that in such cases the suspicion may arise of the existence of hepatic abscess. It must not be forgotten that, as already stated, it is possible, in some instances where the inflammation of the duct is unusually violent, for small disseminated abscesses to form in the neighborhood of the ducts. But this is a rare occurrence, and it may usually be concluded that, in cases where the mode of origin, the occurrence of

spells of hepatic colic, and the presence of extreme local tenderness about the gall-bladder, point to inflammation of the hepatic ducts, even repeated and severe febrile paroxysms are not indicative of hepatic abscess.

The pain that attends inflammation of the bile-ducts has been frequently mentioned, but it remains to speak of it more especially in its diagnostic relations. In cases such as No. 2, where it assumes the form of a reflex intercostal neuralgia, with or without fever, and with depressed pulse-rate, the attack may readily be regarded as one of malarial neuralgia. But the unusual amount of gastric disturbance and the presence of distinct local tenderness not only over the branch of the intercostal nerve but over the gall-ducts, and the ensuing jaundice, will make the nature of the attack clear.

Enough has already been said of the character of the pain that frequently attends the spells of acute obstructive catarrh of the bile-ducts, when occurring as a primary affection or intercurrent in the course of chronic hepatic catarrh. It differs indeed in no respect whatsoever from the pain of hepatic colic due to the passage of a gall-stone. In the violence of the onset; the excruciating character, the distribution, and the duration of the pain; the incessant vomiting, and the collapse of the system, many of the attacks of closure of the duct from acute catarrh vie with ordinary attacks of calculous colic. It is extremely important that the truth of this statement should be clearly recognized, as the prognosis and mode of treatment depend essentially upon the nature of the attack. A careful study of the cases here reported will be sufficient to establish this point. Such attacks frequently occur in young persons who never have had any symptoms of gall-stone, and in whom no subsequent attacks occur; they are usually preceded by evidences of gastro-duodenal irritation; they frequently follow some distinct exciting cause; the most careful search may fail to find a gall-stone after the attack. Further they occur very frequently in patients suffering with chronic hepatic catarrh, and here they are produced so directly and immediately by slight exciting causes as to make their true nature evident. I see no difficulty in accounting for these attacks of hepatic colic in cases of catarrh of the bile-ducts, without the supposition of a gall-stone. When we see the sudden retention of urine that may be caused by an acute catarrh of the urethra with spasm, especially if there has been some pre-existing thickening of the urethral mucous membrane, there seems no difficulty in understanding how an equally rapid closure of the intestinal portion of the bile-duct may occur, and give rise to equally acute and painful symptoms, from severe catarrhal inflammation of

its mucous lining and of the duodenal mucous membrane. The immediate cause of the symptoms in many of these attacks is a sudden closure of the outlet of the bile-duct in the duodenum; there is an immediate damming back of the bile and consequent extreme distension of the ducts; and a state of intensely painful spasm of the walls of the duct is induced that lasts until the accumulation of bile becomes sufficiently great to partially overcome the obstruction and allow some to escape, and thus relieve the tension. In addition to this there seems to be very frequently an intense localized congestion of the peritoneum, which occasionally goes on to the development of fully marked peritonitis with exudation and adhesions.

On the other hand, however, it must be remembered that there is an intimate relationship, both of cause and effect, between hepatic catarrh and gall-stone. If, as has several times been mentioned, the passage of a large gall-stone may leave behind an inflamed state of the ducts, so may a primary hepatic catarrh favor the formation of gall-stones in the gall-bladder, or in the smaller ducts. The stagnation of bile in the dilated ducts, and the presence of viscid mucus or of small collections of proliferated epithelium strongly predispose to the production of small biliary sand which may serve as the nuclei for larger gall-stones. Thus in any such spell as has been described, although it may be thought that the closure of the duct is due to the infiltration and swelling of the mucous membrane, it is very important that careful search should be made for gall-stone. Here I may incidentally remark that the only mode of examining the feces that is entitled to reliance is to carefully wash them through a fine sieve, or a piece of coarse muslin. The ordinary rough mode of examining by mixing the stool with water and stirring it in the hope that the calculus will, if present, rise to the surface, is entirely unreliable. But even when careful search of the stools for several days after the attack fails to discover any calculus, it is still possible that the pain and spasm may have been partly caused by the passage of minute biliary sand so small as to elude detection in the feces. Therefore in cases where the nature of the attack is not rendered evident by the considerations above stated, a very careful examination of the feces should be instituted.

In the following case there would seem to have been numerous calculi in the gall-bladder associated with inflammation of the bile-ducts. It is probable that some of the earlier attacks may have been purely inflammatory in their character, although it is also possible that they may have been caused by the temporary impaction

of a calculus in the cystic duct, which, after causing some distension of the canal, would each time fall back into the gall-bladder.

Case 12.—Mrs. B., æt. 33, stout, strong woman. Weight, in 1869, 100 pounds; in 1876, 184 pounds. Appetite and digestion good. Had the first attack of hepatic colic in 1866, and then not until October, 1876. In the year following, had about fifty spells at irregular intervals. The attacks came on without apparent cause, beginning with pain at the epigastrium, running through to back and round the right side. Vomiting nearly always occurs. The pain frequently lasts several days, though not with the original violence. After a severe attack, jaundice follows, with light-colored stools and dark urine. The stools have been carefully searched after attacks, but no gall-stones have ever been found. There is constant tenderness over the region of gall-bladder and hepatic duct. She was ordered to wear a flannel belt around waist. A pill of argenti nitratis, gr. $\frac{1}{8}$; extr. opii and extr. belladonnæ, each, gr. $\frac{1}{10}$, t. d., and $\frac{1}{2}$ pint Carlsbad water, before breakfast and at bedtime. She was kept on liquid diet for two weeks, and then, as she was improving, she was allowed for breakfast a soft-boiled egg, milk, and stale dry bread; at dinner, a bowl of broth, or sweet-bread with rice and stale bread; and at supper, milk and bread.

She had no spell for five weeks (before this treatment began she had a spell every week or oftener); but then, after premonitory symptoms lasting two days, she had a violent spell of pain lasting five hours, when it suddenly ceased. The stools were very carefully searched, and three small calculi, about the size of peas, were found: one of them in a stool six hours after the attack of pain, the others on the sixth day after the attack. A week later, a very slight one occurred, after which one small calculus was found. A fortnight later, a severe spell occurred, and two calculi were secured. Nitrate of silver had now been continued for sixty days, and about forty grains had been taken. No blue line on gums had appeared. It was now stopped. Carlsbad water was continued, and several blisters were applied at intervals of ten days. No spell now occurred for more than five months, and she enjoyed perfect health. Her diet was made much more liberal, though she continued to be careful. Her weight has averaged 145 pounds. At the close of that period (May 10, 1878) she was much exhausted, and exposed herself while nursing her children, who were ill; and some tenderness over gall-ducts returned, and a slight attack occurred, but without passage of a gall-stone. Nitrate of silver was immediately resumed, and was kept up for fifty days. Soon after, an attack occurred after which a small calculus was found. She has since been quite well.

The possibility of such an explanation of attacks of hepatic colic, as the last one above suggested, is confirmed by the following case, where a large ovoid stone slowly dilated the cystic duct until it approached the common duct sufficiently to exert pressure on it, when fatal jaundice made its appearance. Previously, however, there had been numerous attacks of hepatalgia without jaundice, due to inflammatory irritation with spasm of the ducts.

Case 13.—Mrs. C., æt. 62, first came under my care in April, 1871. She was a large, well-built woman, who had borne a good many children, and in the earlier years of her life had worked hard. After the menopause she began to suffer with pain in the region of the liver and with troublesome dyspepsia. Later she had from time to time attacks of violent pain in the epigastrium and region of gall-bladder, lasting several hours, attended with vomiting, and followed by soreness there. There was never any jaundice, nor, although search was repeatedly made, were any gall-stones ever found. After the attack the

urine would be dark for several days. Between April, 1871, and September, 1872, I attended her in eight attacks. They varied greatly in intensity and duration, but all presented the above general characters. They could not be traced to any definite cause. In the intervals she now had constant tenderness in the region of the gall-bladder, and was obliged to be careful in her diet. She had lost greatly in flesh, and had a sallow, icteroid appearance. Chlorodyne always afforded her quite prompt relief in the attack. In the intervals I used Carlsbad and Vichy waters, chloroform, soda and hydrocyanic acid, counter-irritation, and a constantly restricted and carefully arranged diet. On September 16, while in ordinary health, she was seized with a very violent attack, which did not yield to chlorodyne or even to large and repeated hypodermic injections of morphia. Jaundice appeared on the third day, and rapidly became intense. The urine was loaded with bile-pigment; the bowels were costive, and the stools clay colored. The stomach would not retain nourishment. Her strength rapidly failed, the mind grew dull, and finally coma set in, and death occurred on the 22d of September, on the seventh day of the attack.

At the post-mortem examination, the tissues were all deeply stained with bile. The liver was somewhat enlarged, and was intensely stained. The gall-ducts were dilated throughout its substance. The gall-bladder was not larger than usual; its walls were thickened, and the mucous membrane roughened, and in places discolored. The cystic duct was greatly dilated down to its junction with the hepatic duct. The opening into the latter was also dilated, but not sufficiently to allow a large ovoid, smooth gall-stone, three-quarters of an inch long by half an inch across, to escape. This calculus was tightly impacted in the cystic duct near its junction with the hepatic duct, in such a way as to obstruct the flow of bile through the latter into the common duct. The common duct was only moderately dilated. The walls and lining membrane of all the large bile-ducts showed evidence of inflammatory change.

Treatment.—The views which have been expressed in regard to the pathology of many cases of jaundice—namely, that they are essentially dependent upon obstruction to the flow of bile from inflammatory changes in the duodeno-hepatic mucous membrane—serve as the natural basis for a rational mode of treatment of all such cases. The indications that present themselves are:—

To relieve local irritation and avoid any recurrence of it;

To reduce the swelling and thickening of the affected tissues;

To favor a free secretion of thin bile.

It is needless to say that, in carrying out the above indications many modifications must be made to suit the needs of different cases.

Thus, in the acute stage, the excessive irritability of the stomach must be allayed; and for this purpose I have derived much benefit from the use of subnitrate of bismuth with small doses of calomel (gr. $\frac{1}{8}$ to gr. $\frac{1}{4}$) every two hours; of carbonated water; of a blister applied over the gall-bladder, and of hypodermic injections of morphia. In cases where the attack is accompanied by hepatic colic or hepatalgia, I have frequently found chlorodyne (Bullock & Crenshaw's formula), in doses of fifteen drops, repeated if necessary, to afford relief; but more frequently the immediate resort to hypodermic injections of morphia is preferable.

I may here speak of the diet. While the stomach is still irritable and pain continues, it is useless to give any food by the mouth; it will certainly be vomited. Occasionally iced champagne by spoonfuls will be retained; but if the patient is weak, or if the attack is prolonged, nutritious enemata should be resorted to. As soon as vomiting ceases, small quantities of unirritating liquid food—dilute beef extract, milk and lime-water, koumiss—may be given at short intervals, and the patient should not be allowed any solid food until jaundice and hepatic tenderness have disappeared. Stern restriction of diet at this stage will prevent relapses, and will help to prevent the attack from passing into a chronic form. Later, solid food may be cautiously resumed; but for some weeks all rich food, all acids, or stimulating articles, must be avoided. Rigid attention to diet is equally important in the chronic form of hepatic catarrh, whether or not accompanied by occasional spells of hepatic colic, with increased jaundice. Such patients are more or less emaciated, weak, and depressed; and they are constantly urged by injudicious advisers to eat more heartily, and particularly to take some form of stimulus. Yet, no greater mistake can be committed. Recovery is only to be secured by the faithful observance of a system of diet which shall avoid irritation of the gastro-duodenal mucous membrane, and which shall make as little call as possible on the liver, for aid in its digestion. All forms of alcohol are, therefore, to be positively forbidden. All rich dishes—such as fried articles of any kind, gravies, pastry, puddings, etc.—must be totally avoided; and butter, if used at all, must be taken in very small quantities. All heavy, indigestible articles—such as fresh bread, hot cakes, beans, cabbage, pork, veal—are to be excluded. Sour or tart things—such as pickles, vinegar, strawberries, etc.—are apt to disagree. Finally, chocolate and coffee are to be avoided in favor of broma, racahout, weak black tea, koumiss, or milk with lime-water.

I have dwelt at length upon the details of diet, because I am sure no treatment will avail aught without scrupulous attention to them. I have frequently been astonished at the satisfaction with which such patients will pursue a rigid system of diet on finding how much better it suits them; also at their remarkable gain in flesh and strength while using a diet so much poorer than that on which they had previously been steadily losing ground.

Rest is essential while any acute irritation is present, and the patient should be confined to bed until the local symptoms have disappeared. Equal care should be used in the chronic form to avoid over-exertion, and even more particularly all imprudent

exertion. It is amazing how sensitive patients with chronic hepatic catarrh become to external influences; and just as in a person with chronic nasal catarrh the slightest exposure will cause irritation and obstruction from increased swelling, so in the former condition will it produce increased congestion and swelling of the duodeno-hepatic mucous membrane, obstruction of the bile-duct, and an attack of jaundice often accompanied by a frightful attack of hepatic colic from spasm of the distended ducts. Great care must be paid therefore to exercise and dress. It frequently answers well to have such patients wear a flannel band around the hypochondriac zone, which answers the same purpose as a Holman's liver pad, or any other similar patented appliance.

The function of the skin should be maintained by sponging with salt water, followed by brisk rubbing; but no full-length baths should be allowed.

I have already alluded to the use of a blister as a means of relieving irritation, and I may add that, for the fulfilment of the second indication, the removal of swelling and thickening of the affected tissues, I regard the application of a blister of one and a half or two inches in diameter, every week or ten days, at different points over the duodeno-hepatic region as among the most useful elements of treatment, especially in chronic cases attended with much local soreness and sense of distress or burning.

I come now to speak of what I have been led by repeated observation to consider the most important means of radical and complete cure in such cases. I refer to the internal use of nitrate of silver for the purpose of causing a reduction of the catarrhal swelling and infiltration of the duodenal mucous membrane and of the walls of the bile-duct, so that all obstruction may be removed, the flow of bile be fully re-established, and the morbid irritability of the parts be relieved, so that the danger of relapses may be removed. All our knowledge of the mode of action of this valuable alterative would lead us to regard this as a most suitable condition for its use. The lesions are precisely those which in other places we find relieved by this remedy. We know its potency even in so great a lesion of the gastric mucous membrane as perforating ulcer; and here we have inflammation affecting a mucous tract so near to the stomach that it is impossible to doubt but the remedy can affect it. My first knowledge of its availability in chronic inflammation of the bile-duct was in Case 11, where I was led to use it in apparently hopeless inflammatory obstruction after the failure of many other remedies. Since then I have repeatedly used it both in acute

catarrhal jaundice after the gastric irritability has been quieted, and in chronic hepatic catarrh, and with such uniform good results that I consider it the most valuable remedy in this disease. I have always used it in pill form, giving gr. $\frac{1}{6}$ to gr. $\frac{1}{4}$ thrice daily, soon after taking food. As a rule I have combined with it opium gr. $\frac{1}{12}$ to $\frac{1}{3}$, and belladonna gr. $\frac{1}{16}$ to $\frac{1}{8}$, according to the amount of local irritation and the tendency to spasm. Since my observation already referred to, that during the administration of nitrate of silver a blue line appears on the gums before the slightest trace of discoloration of the skin occurs, I have never hesitated to give the remedy freely, to the extent of 30 grains in one course; then after an interval of two or three weeks to the extent of 15 or 20 grains more; and after an equal interval, to the extent finally of 15 grains additional if necessary. Even in the most severe cases, however, I have not yet failed to effect a cure by the time 50 or 60 grains had been taken. During the intervals, between the courses of nitrate of silver, I have either depended on the use of Carlsbad water alone, or I have used in conjunction muriate of ammonia or chloroform. The latter has been preferred in those cases where the frequency of the spells of hepatalgia seemed to indicate the possible presence of biliary sand, or where I suspected the complication of a biliary calculus. Thus in Case 12 the use of chloroform was apparently beneficial. I may add that in the latter case, where spells of fruitless hepatic colic had occurred at short intervals, it is difficult to believe that it was by mere coincidence that during the last three weeks of a two months' course of nitrate of silver and Carlsbad water, three attacks of hepatic colic should occur with the passage of six gall-stones and be followed by total relief from all symptoms. Holding the views I have above expressed as to the relationship between hepatic catarrh and gall-stones, I suspect that it is not impossible that these calculi (in Case No. 12) may have been retained largely in consequence of an inflamed and thickened state of the walls of this bile-duct, and that after this had been to a considerable extent relieved, it became possible for the gall-stones to escape. Thus even in cases where hepatic catarrh is believed or known to be associated with biliary calculi, the plan of treatment I am recommending appears applicable.

I have had frequent occasion to allude to Carlsbad water, and it is upon this in conjunction with the foregoing treatment that I chiefly rely for carrying out the third indication—the securing a free flow of thin healthy bile. The peculiar combination of salines found in Carlsbad water seems to give to it a special action on the secre-

tion of bile as well as on the secretion of the gastro-intestinal mucous membrane. In these cases, therefore, it appears to me to render the bile less viscid and also to exert a good alterative action of the thickened walls of the duodenum and bile-duct. It may be taken either in the form of the imported Carlsbad water, or of the granulated effervescing Carlsbad salts (which is not much, though somewhat, less satisfactory than the natural water). A half pint of the water should be taken before breakfast and at bedtime, unless it happens to exert a laxative effect.